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ABSTRACT

Two perspectives of descriptive research are discussed: first-order, which describes the world as it is; and second-order, which describes the world as people experience it. The latter perspective is known as experiential description. Research in a variety of disciplines, notably the work of Darwin, Werner, and Piaget, has provided experiential descriptions of the qualitatively different ways in which people perceive and understand reality. According to the experiential perspective, conceptions of understanding are not seen as individual qualities, for there can be no conceptions as such, just as there can be no learning and no structures of thought as such. Conceptions of reality are considered rather as categories of description to be used in facilitating the grasp of concrete cases of human functioning. Since the same categories of description appear in different situations, the set of categories is thus stable and generalizable between the situations, even if individuals are moving between the different categories on different occasions. The totality of such categories of description denotes a kind of collective intellect, an evolutionary tool in continual development. (Author/CP)

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DESCRIBING CONCEPTIONS OF THE WORLD AROUND US

Ference Marton

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Abstract

This paper puts forward arguments in favour of research which has as its aim to find and systematize forms of thought in terms of which people interpret significant aspects of reality. The kind of research argued for is complementary to other kinds of research; it aims at description, analysis and understanding of experiences, that is, it is directed towards experiential description.

A fundamental distinction is therefore made between two perspectives. In the first-order perspective, which is noumenal or matter-of-fact, the intention is to describe the world as it is. The second-order perspective (for which a case is made in this paper) is phenomenal, experiential, the-world-as-perceived, the intention is to describe the world as people experience it. From the two different perspectives different aspects of reality are visible and we arrive at different levels of description.

Research in a variety of disciplines, sub-disciplines and "schools of thought" has provided us with experiential descriptions, that is, content-oriented and interpretative descriptions of the qualitatively different ways in which people perceive and understand their reality. It has however seldom been recognized that these various research efforts share a common perspective in their view of phenomena and a unifying scientific identity has in consequence not been attained.

Conceptions and ways of understanding are not seen as individual qualities, for there can be no conceptions as such, just as there can be no learning and no structures of thought as such. Conceptions of reality are considered rather as categories of description to be used in facilitating the grasp of concrete cases of human functioning. Since the same categories of description appear in different situations, the set of categories is thus stable and generalizable between the situations, even if individuals are moving between the different categories on different occasions. The totality of such categories of description denotes a kind of collective intellect, an evolutionary tool in continual development.

LEVELS OF DESCRIPTION

In Educational Psychology questions are frequently asked about, for example, why some children succeed better than others in school. Any answer to this question is a statement about reality. An alternative is a question of the kind asked by Säljö (1978): "What do people think about why some children succeed better than others in school?" Any answer to this second kind of question is a statement about people's conception of reality. These two ways of formulating questions represent two different perspectives. In the first (and by far the most common) perspective, the intention is to describe the world as it is. In the second, the intention is to describe the world as people experience it. We call the former, which is noumenal or matter-of-fact, a first-order perspective, and the latter, which is phenomenal, experiential, the-world-as-perceived, a second-order perspective[1]. The two perspectives are viewed as complementary. The purpose of this article is to put forward arguments in favour of the second-order perspective.

The identification of two alternative perspectives has nothing to do with the metaphysical distinction between the real and the apparent, but rather with the notion that reality can be viewed from more than one perspective and that "ultimate" descriptions of reality are not attainable. Neither the "real-ness" of a reality independent of our perception of it nor the "real-ness" of our experience of this reality is thus examined and still less questioned here.

It does not follow from the statement that there is no single given and self-evident perspective from which the world should be seen that any perspective is equally justified in each concrete case. On the contrary, one of our most basic points of departure is that there ought to be a non-arbitrary relationship between what we are looking for in our research and the direction from which we do the looking. From the two different perspectives identified, for example, different aspects of the world become visible, and we arrive at two different levels of description corresponding to the two different perspectives from which what is to be described is seen.

There are two reasons for arguing in favour of the formulation of questions of the alternative, second-order kind. Firstly - and most obviously - we consider that to find out the different ways in which people interpret, understand, apprehend, perceive and conceptualize various aspects of reality is sufficiently interesting in itself. Secondly, the level of description in terms of which we characterize answers to such questions is, as far as we are able to discern, autonomous. It is not autonomous in the sense that the aspects of reality described at this level are independent of aspects of reality described on another level; rather it is autonomous in the sense that the aspects of reality described at this level cannot be derived from aspects of reality described at another level. This means that if we are interested in (to return to our example) the ways in which people explain differences in school success, then it is this very problem which we have to investigate. In other words, answers to the question of how people think about school success cannot be derived either from what we know (or will find out in the future) about the general properties of the human mind, or from what we know about the school system, or even from the combination of what we know about both.

From different perspectives, then, different aspects of reality are visible. When we are looking for something which is not visible from our own perspective, we commit what Ryle (1949) calls a "category mistake". In one of the illustrations he gives, a tourist is walking round Oxford looking at college buildings, libraries, scientific institutions. "Well, all this is very interesting," he asks, "but where is the University?".

Classical questions like "What is the real nature of intelligence?" or "How much do heredity and environment contribute respectively to differences in verbal ability?" do not appear in the second-order perspective of perceived reality. On the other hand, different ways of understanding various kinds of subject-matter, for example, can only be seen from this point of view.

To recapitulate: we thus distinguish between two perspectives and from these we arrive at two different levels of description; that of matter-of-fact statements (first-order or noumenal level) and that of world-as-perceived statements (second-order or phenomenal level). Now matter-

of-fact statements are concerned wit.. the description of reality and our own basic assumption is that there is no given common description of reality. Rather, there are different descriptions made from different perspectives. Perspectives represent, however, ways of perceiving and interpreting reality. Matter-of-fact statements belonging to one level of description thus originate in conceptions of reality belonging to the other level. As different conceptions in themselves commonly represent different perspectives, "our" second-order perspective is simply one perspective which in our presentation is superordinate to other perspectives[2].

The fact that one distinction between perspectives (between what we have called first and second-order perspectives) is considered as superordinate to other distinctions between perspectives (e.g. between casual and intentional perspectives) in the present paper is a matter of "centering", i.e. a question of from which part of a whole the rest of the whole is viewed ("the whole" referring to the "world of conceptions" in our case). With a different centering the distinction which is superordinate here would appear as subordinate if it were to appear at all. In fact the very distinction between statements about reality and statements about appearances is far from self-evident.

> Schatzman and Strauss (1966) have, for example, described differences between groups of people from different social strata interviewed about a disaster in which they were participants, a tornado that ravaged their communities. The authors conclude that "...Almost without exception any description offered by a lower-class respondent is a description as seen through his own eyes, he offers his own perceptions and images directly to the listener ... because he takes for granted that <u>his perceptions represent reality</u>" (our italics) (p 444).
>
> In contrast to this the description given by the middle-class respondent "...may be given from any of several standpoint (as) he recognizes .. that <u>imagery may be diverse</u> (our italics) (ibid, p 444).
>
> Similarly, in "A girl describes her office" in Max Wertheimer's posthumous book <u>Productive Thinking</u> (1945), the girl's equating of her perception with reality can be assumed to underly her inability to give a "decentered" description of the organizational hierarchy in the office.

> As a third example we might mention Piaget´s well-known experiments with children confronted with a scale model of three mountains placed on a table. They are shown photographs of the model taken from different angles. A doll is placed on one side of the table and the child is asked to select the photograph which shows what the doll "sees". In the original investigation a number of the younger subjects repeatedly selected the photograph showing one particular perspective: their own. Piaget believes that this reflects the "... inability to distinguish the other´s viewpoint from one´s own ..." Flavell, 1963, p 332).

The ability which the children lack evidently represents a developmental level not only in the ontogenetic but also in the phylogenetic sense.

A citation from a paper by Buck-Morss (1975) is relevant here:

> "As to the concept of spatial perspective, it should be noted that this was a 15th-century invention first elaborated by the Florentine, Leone Battista Alberti in 1435, and very much tied to the man-centered secular cosmology which became dominant in the bourgeois era. Central to the logic of representing two dimensions in a threee-dimensional space is the distinction between reality and appearance, and this has become a fundamental principle in the thinking of Western society, while in som traditional African languages, the verbal distinction does not even exist ..." (p 40).

The paper from which the citation is taken in fact comprises a critique of the separation of form from content in Piaget´s theory (an issue which will be discussed later in this paper). Buck-Morss draws on Lukács´ (1971) thesis that there is

> "... A structural identity between mind and society and that the logical structure of abstract formalism, far from being universal is itself a product of history, i.e. the form of cognition is itself a social content" (Buck-Morss, op cit, p 37)

to argue that Piaget´s theory is a mapping of how children in a certain society (the capitalist, industrialized Western society) gradually acquire or construct some of its main features, notably its abstract formalism (i.e. "... the ability to separate form from content, and the structuring of experience in accordance with that distinction" (ibid, p 38). Here we can see that in her critique of the socio-economic bias in Piaget´s theory, Buck-Morss is questioning the distinction between appearance and reality. The point she wishes to make is that since the theory is about the acquisition of abstract formalism and since abstract formalism characterizes the structure of one society but not of the

other, cross-cultural studies cannot be said to be comparisons of different conceptions of the same reality. The same argument holds, she contends, for comparisons between people from different social strata within the same culture. When we find systematic differences, for example, in moral judgement or in the conception of the law, we should be cautious about accepting such differences as different interpretations of the same reality. More probably - according to her line of reasoning - they are different interpretations of different realities.

In one sense this is a truism: differences in thinking obviously reflect differences in the experienced reality. And differences in the experienced reality reflect differences both in experiences and in realities. Our own point is essentially that we cannot separate the structure and the content of experience from one another. Viewed in this way, judgements concerning cross-cultural or cross-strata comparisons of levels of intellectual development turn out to be unjust. There are no equal opportunities to proceed through the levels of the Piaget "scale of development". Rather the kinds of intellectual development possible vary between different cultures or different social strata. In growing up, people learn to conceptualize their own reality.

The aim of the research programme argued for in this paper is not, however, to classify people, nor is it to compare groups, to explain, to predict, nor to make fair or unfair judgements of people. It is to find and systematize forms of thought in terms of which people interpret aspects of reality - aspects which are socially significant and which are at least supposed to be shared by the members of a particular society; namely, our own.

The kind of research we wish to argue for is complementary to other kinds of research. It is research which aims at description, analysis, and understanding of experiences; that is, research which is directed towards experiential description.

Here the question of centering crops up again. As researchers we are culturally and socially biased: we see the whole (the system of thoughts) from one of its parts (and not from the outside) when for instance we describe various conceptions of time, of space, and of the distribution of power in society. In embarking upon research, we have already arrived

at a particular structuring of reality, given that various conceptions of time, for instance, in some sense reflect differences in thinking about the same aspect of reality. The very choice of those entities the conceptions of which we describe differences in is by no means self-evident and certainly is rooted in a specific way of thinking. The description is thus made on our own conditions, and what we arrive at as results are in fact categories for our description of the categories in terms of which people interpret their reality or realities.

Moreover, as we have already pointed out, the entire argument is based on a certain way of thinking which has as its starting-point the idea that reality and the perception of reality are not necessarily identical, and that the same reality can be perceived in different ways. Nevertheless, having made this bias explicit and in spite of our being aware that the variation between forms of thought which we derive may represent variation both in the social significance of what is thought about and in the reality of the people who think about it, we consider it an interesting and a worthwhile undertaking in itself to describe this variation. Furthermore, we believe that questions can be meaningfully phrased on a descriptive level, irrespective of the origins or consequences of the conceptions described on that level and without even taking a stand in relation to Kant´s idealistic claim for the "Copernican Revolution" ("Our consciousness is not shaped by reality, but reality is shaped by our consciousness") or to Marx´ materialistic claim for the reverse ("Reality is not shaped by our consciousness, but our consciousness is shaped by reality").

All this may seem rather remote from the background to this paper, two recent paper symposia in the British Journal of Educational Psychology. It is not that large a step, however. The main argument which Buck-Morss raised in her paper concerns the socio-economic bias inherent in Piaget´s theory, since Piaget equates intellectual development with the acquisition of abstract formalism (i.e. "... the ability to separate form from content ..."). Yet not only is abstract formalism characteristic of intellectual development as it appears in the theory but it is also characteristic of the theory as such. In the paper symposium on Practical and Theoretical Issues in Piagetian Psychology, Brown & Desforges (1977) conclude that:

> "The search for a structure irrespective of content has led to generalities which cannot be sustained. More of the same kind of research is unlikely to 'fill the gaps' for there is no paucity of information, but an embarassment of dissonant information. The vague conclusions of Piagetian research may well be a consequence of the search for content-free mental structures, a strategy which is arguably misguided. It would seem more profitable to locate cognitive structures within specific content domains." (p 15)

Noel Entwistle's editorial introduction to the other paper symposium Learning Processes and Strategies, (which in fact appeared first of the two) is entitled "The verb 'to learn' takes the accusative", and in our own paper we argue that "... learning should be described in terms of its content" (Marton & Säljö, 1976, p 10). Our argument does not concern another way of describing learning as such: on the contrary, it concerns the impossibility of describing learning as such. Nor is our point that content should be taken into consideration as a parameter in addition to variables and parameters already considered. What we have in mind is rather a shift in perspective.

The process and content of learning

The application of general principles of learning to educational contexts has traditionally been considered one of the main tasks of Educational Psychology. It is based on the idea that general principles of learning refer to the process and the conditions of learning, i.e. to the general properties of mental activities or of behavioral changes as well as to the factors operating upon them. The content of learning has almost always been thought of as being defined by the various disciplines of academic study such as Mathematics, Physics, Biology, etc.

The assumption is that, having gained sufficient knowledge about the learning process in general, we can apply what we know to the various disciplines in order to find out what it takes to learn Mathematics, Physics, Biology etc. According to this line of reasoning, given that we know what it takes to learn or to comprehend in general and that we are familiar with the correct meaning of, for instance, the derivative or of Darwin's theory of evolution, there is only a small step to be taken in order to find out what it takes to learn about or to comprehend the concept of the derivative or Darwin's theory of evolution. In terms of the distinction made above between two levels of descrip-

tion (between first- and second-order perspectives) it has been thought that learning a specific content could be described by means of a combination of matter-of-fact (first-order) statements about on the one hand, learning, and on the other, about content. This idea of learning is, however, based on the notion of the transfer of ready-made concepts or principles into the empty spaces in the students' heads. If we think instead of the content of learning in terms of what is in the students' minds rather than of what is in the textbook, it clearly seems preferable that the content of learning should be described on the second-order (or experiential) level. This view is based on the belief that the question of the content of learning does reasonably not concern the correct meaning of the derivative or of the Darwinian theory of evolution but rather the meaning the students put into the derivative or into the Darwinian theory of evolution.

> In one of our experiments on the understanding of content (Marton and Dahlgren, 1976), a number of subjects read two chapters of Paul Samuelson's famous textbook Economics. Among the basic principles discussed in the text was the law diminishing returns, which states that when one production factor, such as land, is constant and another, such as labour (i.e. number of workers), is increasing linearly, then the total production will increase less and less (i.e. in a negatively accelerated fashion). Another principle which students read about in the experiment was the Malthus theory of population, which is in fact a straightforward application of the law of diminishing returns in a global perspective and which states that when the population is increasing and the total amount of cultivable area on the earth is constant there will be a wider and wider gap between the increment in population and the increment in production.
>
> We found a crucial difference in the understanding of both laws. This difference was between the correct understanding of the gradual decrease of increments in the production and the misunderstanding of this in terms of a linear increment up to a certain level and no increment thereafter. We interpreted this reduction of complexity from "change of change" to "change, no change" in terms of the difference between a dynamic and a static conception of productive resources. In the first case resources are perceived as a potentiality which becomes more and more realized, steadily approaching an asymptotic level; while in the second case resources are seen as a more or less finite and concrete amount of something, like a cake which can be cut into a number of pieces - the greater the number of pieces, the smaller is each person's share.

In the teaching process, students have various conceptions which we try to change, modify or successively replace. The conceptions held by the students - as a rule - differ from those which the author of the textbook or the teacher is trying to make the

students acquire (or construct). This discrepancy is certainly there during the learning process and it is not infrequently there too when the class has to proceed to the next topic. What these conceptions are, however, does not follow either from any general properties of the learning process, or from the subject matter as defined by the teacher or by the textbook. Consequently, if we accept the thesis that it is of interest to know about the possible alternative conceptions students may have of the phenomena or the aspects present in, related to or underlying the subject matter of their study, it is these questions specifically which we must investigate. If then we wish to find out what it takes to learn or to comprehend the concept of the derivative or the Darwinian theory of efolution, for purely logical reasons it is not sufficient to have knowledge about learning and comprehending in general, in addition to our knowledge of the derivative and of the Darwinian theory of evolution. Our task is rather to study specifically the learning and comprehending of the concept of the derivative and of Darwin´s theory.

There is a further point to be made here. We have already argued that process and content refer to two different levels of description (see however, note 3 below). But we should also point out that in order to derive the various forms of understanding of a certain concept or principle from general properties of cognitive functioning on one hand, and from the description of the actual content domain on the other, we would need both knowledge of the machinery of the mind and a uniquely suitable description of the domain. But how could we possibly arrive at the latter? Even if there were general agreement at a certain point in time on the scientific way of describing the domain (which is frequently not the case) we would still have to contend with the problem that descriptions and definitions inevitably change in the course of scientific progress.

> Strauss and Kroy (1977) have for example criticized the Inhelder-Piaget theory of formal operations for its intimate linkage with Newtonian physics. Putting it in very general terms their question is the following. If possession of the structure d´ensemble underlying the stage of formal operations leads to reasoning in terms of Newtonian physics, has no-one living before the invention of Newtonian physics mastered the level of formal operations, and will all those who possess these formal operational structures of thought remain true to Newtonian physics for all time?

As to our argument that learning should be described in terms of its content, it must be said that clearly no experiment on learning can be undertaken without some content. But content has, in practically all studies of learning, an instrumental function, i.e. it is used in order to find out some general properties of learning and not from an interest in the content as such. Now there is of course nothing wrong with being interested in general properties of the learning process. What we wish to question is the consideration of process and content as two separate entities, the former being seen to operate upon the latter.

If we view content in the sense suggested above, that is as apprehended (experienced) content, it seems obvious that both process and content are aspects of the same undivided whole, seen from two different perspectives and described at two different levels.

Attempts to characterize the learning process have almost always been formulated in terms of statements about reality, that is, these attempts belong to the first-order perspective[3]. Statements about content on the other hand, following our line of reasoning - are (or rather: should be) formulated in terms of the perceived reality (i.e. in terms of the perceived subject matter) and they belong thus to what we call here the second order perspective.

Process and content are two different aspects constituting a logical unity; there can be no process without a content and there can be no content except in terms of a mental activity. (Since we use'content' in these sense of apprehended content, the act of apprehension is a necessary tacit assumption). The relationship between process and content can be illustrated using Colaizzi´s metaphor. He refers to the well-known reversible picture which can be perceived either as two profiles or as a vase:

> "Without the profiles there could be no vase, and likewise the vase is required for the profiles. Assuredly, however, no one would think of claiming that the profiles cause the vase or that the vase causes the profiles. We can say only that without the one, the other is inconceivable, i.e. not visible: the two co-constitute each other " (Colaizzi, 1973, p 21).

The process of learning is thus not seen as an independent entity but is basically considered as a perspective. This is implied by its character, which is that of a relationship between the observer and the observed rather than an inherent quality of the latter.

This issue has a certain resemblance to the historical dispute between the philosophical standpoints of nominalism and realism. According to the former, we can use words signifying general concepts like "colour" or "man" to describe concrete things or living beings, but these words do not denote anything independently of those things or beings which they are used to describe. The view of the realist school, however, is that words signifying general concepts do denote entities with an independent existence.

Throughout this argument, the limitations of description play a very central role. We do not believe in the possibility of "comprehensive coverage", of a "total" description of any phenomena in the real world, in the same way that we do not believe it possible to find the "essence" of the phenomena or to arrive at an "ultimate" explanation of them.[4] To consider a description as a relationship between the observer and the observed implies that the description is dependent on the perspective of the former. Now the very perspective which is basic to the research programme put forward in this paper concerns precisely the description of perspectives. At the risk of repeating ourselves: the actual perspective chosen here is thus one element in the infinite set of possible perspectives, but precisely that perspective from which the set to which it belongs is visible.

There is, in our view, no such thing as "the true essence of learning", but we can choose to describe learning from one point of view or another. Furthermore, we must be aware of the fact that what we can see from one point of view may not have any representation from another point of view. If we are interested in the general properties of the learning process, we have to use a language for describing similarities across a variety of learning tasks. But different conceptions of a certain phenomena or of a scientific principle cannot be described in this language; in fact, they are not even visible form this perspective.

The issue (albeit a different one) of intentionality which we discussed earlier is treated in a structurally similar way by Jansson (1975), who argues that intentionality is nothing but a perspective:

> "In an objectifying (i.e. deterministic) perspective intentionality has no representation, however finely graded the standard of measurement used by the researcher" (p 72).

In the objectifying perspective, to re-state an earlier point, acts appear as behaviour, while in the intentional perspective behaviour appears as acts. And it is surely not possible to arrive at a decision as to whether what one is doing is an act or a behaviour by carrying out a "crucial experiment". Rather one can choose to consider it as an act or as behaviour.

CONCEPTION OF THE WORLD AROUND US

In the classroom we can probably always find a variation in the way students understand the concepts and principles presented by the teacher or by the author of a textbook. As we argued earlier, at the time the class is moving to a new topic, the concept or principle is understood by some students in a way which is similar to the teacher´s or the author´s conception and by other students in other ways which differ from it (and from each other). The "authorized" conception can then be considered as one of several possible forms of understanding of the concept or principle in question.

This "authorized" conception, which is hopefully in accordance with the standpoint of modern science, is not only a special case in relation to the varying conceptions prevalent in the classroom but it is also a special case among the varying conceptions science itself has held during its history.

A conception of a certain aspect of reality accepted as the scientifically correct view is not something given, something which is to stand for all time. (As a rule it is not even agreed upon by everyone during the same period of time). Historically there have been other dominant conceptions no longer taken as correct and it is not unreasonable to think that there will be others in the future. The scientifically accepted conceptions of today appear thus as a section in time as well as a special case of the variation in people´s commonsense conceptions of the same aspect of reality which exists at the same point of time.

Furthermore, we often find that these two kinds of qualitative variation correspond fairly well to one another. Commonsense conceptions held by today's laymen and judged wrong by science frequently turn out to be identical to conceptions accepted previously in history as scientifically valid ways of thinking.

> In their investigation of proportional reasoning in adolescents Johansson and Lybeck (1978) revealed two major forms of thought with several subcategories within each. Let us take a simple example. The problem is the following: a car moves at a constant speed and in 3 seconds it travels 6 meters. What distance does it travel in 9 seconds. Both correct and incorrect solutions can be arrived at in either of two possible ways. On the one hand the student may focus on the relationship within the variables; "9 is 3 times 3, thus I have to multiply 6 by 3, which makes 18". On the other hand

he may concentrate on the relationship between the variables: "6 is twice 3, thus I have to multiply 9 by 2 which makes 18".

From the point of view of mathematical calculus it is of course quite irrelevant which of the two approaches is used. In physics however, it does make a difference: relating two different qualities to each other in terms of a quantified relationship is central to the use of the concept of function in physics. The second approach described above is thus far more fruitful if the student is to progress in his studies.

Historically the first form seems to have preceded the second. When using a two-armed lever as a balance to measure weight by means of length, Archimedes (according to Lybeck) either computed the ratio between the heavier and the lighter weight or between the larger and the shorter arm of the balance, but did not compare length and weight directly by taking the ratio between either the longer arm and the heavier weight or between the shorter and the lighter weight (Lybeck, 1978, p 33).

Differences in the conception of various aspects of reality can of course not only be found between individuals or between different periods in the history of science[5]. Our conceptualization of learning in terms of possible changes in the way the students view subject matter clearly concerns differences within individuals.

Changes in the individual's way of interpreting certain aspects of reality is often a crucial component of scientific discoveries. This is lucidly illustrated by Gruber's (1974) thorough analysis of the developments in Darwin's thinking which led up to his formulation of the theory of evolution.

In Gruber's account, Darwin ".... began with a notion of a stable, harmonious natural order, in which all organic beings were adapted to each other and to their physical environment in a fashion ordained by the creator" (p 20). This is a static conception; homogeneous, unchanging species are adapted to their unchanging physical environments. The notion of natural selection was not in point of fact unfamiliar to Darwin, but he thought of it in the sense of a conservative force; a guard against change, a mechanism for selecting out those examples less well adapted to the unchanging environment. However,"...as he came to accept modern geological views of a constantly changing order in the physical world, a contradiction within his point of view developed as follows: each species was adapted to its milieu: the milieu was undergoing constant change, and yet the species were changeless" (loc cit). From this contradiction he arrived at the conclusion that "...in a changing world, species must change in order to remain adapted" (ibid, p 103).

This change in his thinking went hand in hand with his observations on the Galapagos Islands on the enormous variation within species. And then upon reading Malthus' essay on population (and having given special consideration to Malthus' notion of superfecundity) Darwin realized "... that natural selection, although it might work against adaptive variants, could also work in favour of occasional variants which were better adapted than their ancestors to the prevailing conditions under which they must survive" (ibid, p 105). We see then how Darwin's static conception of unchanging species protected from maladaptive variation by natural selection (selecting out maladaptive members) becomes transformed into a dynamic conception of changing species, developing due to variation by natural selection (selecting in better adapted members).

Rather like a figure-ground reversal, the view of variation as deviance from the ideal of today is thus changed to the view of variation as a yet unrealized possibility of the ideal of tomorrow. When applied to mankind, the former view is similar to what is called "social Darwinism" (the concept of which is discussed below). Both conceptions currently exist side by side, representing a fundamental difference in people's thinking.

In Darwin's case what Gruber calls "family Weltanschauung" played a decisive role. Mutaphilism (seeing variation and change as the essence of nature) has been identified as one of the most characteristic attributes of the Darwin family's world view. Compare the grandfather Erasmus Darwin describing Nature's origination of life:

"From embryon births her changeful forms improve, Grow, as they live, and strengthen as they move"

with the closing lines of On the Origin of Species:

"From so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved" (ibid, p 49).

In social Darwinism, "the pitiless struggle of man against man" is seen as the mechanism by which society will be brought to perfection. The term "social Darwinism" itself implies its origins in Darwin's theory of evolution, but as Dunham (1948) points out, the same idea was explicitly formulated by Herbert Spencer in his Social Statics published exactly nine years before the Origin of Species. "The poverty of the incapable, the distress that come upon the imprudent, the starvation of the idle, and those shoulderings aside of the weak by the strong, which leaves so many in shadows and in miseries are the decrees of a large, far seeing benevolence" (Spencer, 1888, p 354). This far-seeing benevolence ensures that the strong survive and the weak do not.

But whereas for Darwin the idea of variation (within species) was transformed by means of natural selection into change (between species) Spencer saw the conception of variation (within species) as being reduced by means of natural selection for preservation (of the specie).

> Here then are two opposing conceptions of the natural order. And both, as we have already noted, are forms of thought, categories by means of which people interpret an aspect of the world around them.

Darwin's thinking was used to illustrate the notion that different conceptions are not necessarily related to differences between individuals but may equally well be related to differences within individuals. Moreover, the concept of "family Weltanschauung" implies that a certain conception is not even necessarily related to a single individual at a given point in time. Gruber uses the term in order to describe conceptions which characterize not simply individuals but more particularly the higher order unit of a family tradition. In the same way we can formulate meaningful questions about the conceptions of reality dominant in a particular epoch, a particular culture, or in a particular society.

> Lukács' work can serve as one example of this, since he considers certain forms of thought as not only related to but even as aspects of the organization of production in society. He argues, for instance, that "... in the 'facts' we find the crystallization of the essence of capitalist development into ossified, impenetrable things alienated from man" (op cit, p 184). In his view a particular conception of facts belongs to a particular economic order.
>
> A further example of this notion of a conception which tacitly underlies a society or a culture can be found in Janik and Toulmin's (1973) analysis of the cultural context of Wittgenstein's thinking (and of his world-view in particular). The authors argue that the Tractatus should be understood partly in terms of Wittgenstein's philosophy, according to which a line should be drawn between what we can speak of and what we must be silent about (as the positivists think) and partly in terms of Wittgenstein's world-view that what really matters is that of which we cannot speak (which runs directly counter to positivist thinking). What we cannot speak of (such as ethics for example) we can still show, we can point at, we can live. According to Janik and Toulmin this world-view mirrors an aspect of the Austro-Hungarian Empire at the beginning of this century. It was a society in which the links between the world of words (politics as it was officially presented) and the world of deeds (the practical solution of authentic social and political problems) were essentially dissolved, resulting in a profound corruption of thought and standards.

Throughout this paper we have argued for what we call the second-order perspective of statements-about-perceived-reality, which is considered to have a complementary relationship to the first-order perspective of statements-about-reality. We have pointed out sources of variation such

as differences in learning, differences in the history of science, differences arising in the accomplishment of a scientific discovery and differences between societal epochs.

The second order perspective is by no means a new discovery. On the contrary, we can find many descriptions in the literature of the ways in which people's understanding of the world around them varies between, for instance, different cultures, different developmental levels or between different clinical states.

It is, however, the very commonness of the perspective (or of the level of description) which has not been paid attention to, or which at least has not been pointed out explicitly. The main focus of interest has therefore been the source of variation and not the variation as such. The qualitative differences obtained have been looked upon instrumentally, they have been of interest in so far as they have served to illustrate the effects of differences in culture, development or mental health. The results (in terms of conceptions of various phenomena) have also seldom been related to findings originating from studies of other sources of variation concerning the conceptions of the same phenomena and described on the same level of description. In other words, while there has been considerable interest in studying differences between different cultures (e.g. in regard to conceptions of time, space or social justice), between developmental levels (e.g. in regard to conceptions of time, space or social justice) or between clinical states (in regard to conceptions of time and so on), there has been little interest in questions like "What are the different conceptions which people have of, for example, time, space or of social justice?" thus bringing together information from studies directed towards investigating separate sources of variation (such as, for instance, differences between cultures, developmental levels or clinical states). The source of variation has practically always been superordinate to that which varies (i.e. conceptions of a certain aspect of reality). What we are arguing for here is a shift of perspective by means of which we might turn the classificatory system on its axis and begin to use conceptions of various aspects of reality as the superordinate categories instead of those sources of variation which give rise to variation in the conceptions (such as individual differences, development, learning etc).

In this respect Heinz Werner has been something of an exception. The aim of the study of development is in his view "the establishment and description" of forms of, for instance, thought and perception which can be ordered in terms of a progression, irrespective of the source of variation. In his book "The Comparative Psychology of Mental Development" (1948) that which varies is in fact superordinate to the source of variation. Under headings such as "Notions of time" and "Notions of space", he brings together evidence from anthropological, child-developmental and clinical studies.

> As to conceptions of time, to take one example, Werner points out a basic difference between a "concrete time of action embedded in a continuum of activity", i.e. time as something closely related to what you do or to what happens to you, on the one hand and the abstract continuous time-ordering scheme, with as it were an existence independent of the concrete reality, on the other. Werner refers, for instance, to Malinowski's description of the elaborate system of "gardening time" used by the Trobriand Islanders, a way of defining events temporally by referring to the concurrent activity): "The native will say: This happened o takaywa, that is 'during the cutting of the scrub'. Or he may use the expression wa sopu, 'in the planting time' etc (op cit, p 183).
>
> More recently Mbiti (1969) has described the African conception of time in a very similar way. Time is seen as a composition of events; there is thus no time unless something is happening. You cannot tell somebody that he is wasting his time when he is sitting down and not doing anything: "Those who are seen sitting down are actually not wasting time, but either waiting for time or in the process of producing time" (p 19).
>
> In literate societies, evidently as an effect of schooling, the egocentric action-of-time conception is slowly abandoned for (or substituted by) the abstract general conception. The latter can, however, occasionally be broken down. Werner refers, for instance, to a case reported by the distinguished neurologist Sir Henry Head of an aphasic who following the loss of the abstract schema employed a concrete time of action. Although the patient could not tell time by the clock, he was nevertheless able to order his day punctually. He had a concrete qualitative time-scale made up of dominant moments in the succession of daily events: "Then when you eat". "Then when you arrive there" etc (op cit, p 190).
>
> Similarly, Werner says, "With small children the temporal idea is marked by a concrete and effective character-of-action" (ibid, p 185). The abstract, objective, impersonal scale of time, the continuity of which is divided into an unlimited number of intervals of equal length, is mastered (or constructed) gradually by the child during its development. But initially, time has a very irregular structure consisting of isolated and discontinuous chunks linked to specific events. Piaget's work on the child's conception of time appeared six years after Werner's book. Piaget (1946) also stresses the gradual development (or construction) of a "homogeneous" (i.e. abstract or independent) common time scale for all events. He is above all interested in the child's perception of the temporal as-

pects of movement, for instance, of movements of different speeds occurring simultanously. It seems as if, prior to the accomplishment of its homogeneous character, time is something different for different events; each movement appears to have its own local time.

Underlying the difference between the two conceptions of time as well as many other similar diferences is the differentiation between object and subject, a basic aspect of Werner's developmental psychology:

"... a state involving a relative lack of differentiation between subject and object is developmentally prior to one in which there is a polarity of subject and object. Thus the young child's acceptance of dreams as external to himself, the lack of differentiation between what one dreams and what one sees, as is found in psychosis, or in some non-literate societies, the breakdown of boundaries of the self in mescalin intoxication and in states of depersonalization - all of these betoken a relative condition of genetic primordiality compared to the polarity between subject and object found in reflective thinking" (op cit, p 127)[6].

This differentiation between subject and object is also fundamental in Piaget's developmental psychology, as Buck-Morss notes somewhat peevishly in her article:

"For Piaget, the first great cognitive leap is the prototypical experience of alienation. It is the ability of the child to divorce subject from object, hence to grasp the building block of Kantian dualism (and of industrial production)" (op cit, p 40).

It was Werner who gave the system of categorization the axial turn we are arguing for here by superordinating that which varies rather than keeping to the conventional approach of using source of variation (whether of developmental, cultural or pathological differences) as the basis for the classification of research findings.

The system of disciplines and subdisciplines and the different "schools" of thought within them constitute another higher-order principle of organization. Here too we can find many examples of experiential description, - that is, description which is experiential, descriptive, qualitative, content-orientated and interpretative and in which the individual's world and not the individual himself is "thematized" and described - both within different disciplines such as psychology, anthropology, sociology, and educational research and in the different "schools" of thought which exist within and between disciplines.

Goldstein and Scheerer's (1941) thorough qualitative analysis of the way the world appears in schizophrenic thinking is, for instance, one of the foundation-stones on which Werner's Comparative Psychology of Mental

Development is built. Another starting-point is Levy-Bruhl's (1923) pioneering investigations of the categories in terms of which reality is interpreted in non-literate societies. Schutz and Luckman's (1973) argument that the structures of socially constructed reality should be revealed and described is only one among many clear examples of such an orientation in sociology. In educational research we can single out Patricia Carini, who has been working outside the mainstream of traditional educational research in collecting a large number of case studies in which the world of school "as it presents itself to different pupils" is described and in which qualitative charges in this world are analyzed in a longitudinal perspective case by case (see for example Carini, 1978).

As to different "schools" or different research traditions, qualitative descriptions of the experienced world can be found both in phenomenological research (which represents a shift of focus in which the "real" outer world stands back and "...the experiencing individual's own world comes forward" (Jansson, op cit, p 47)) and, for instance, within the gestalt school, the founder of which, Max Wertheimer, provided us with a very thorough qualitative analysis of different people's structuring and understanding of the content of various problems of genuine interest - and in so doing indicated a new direction for the study of thinking which has unfortunately hardly been understood by succeeding psychologists.

Two other "schools" have certain similarities both to one another and to the phenomenological and gestalt schools. One is genetic epistemology, the first major aim of which is to discover and describe various forms of thought in "...the growth of all knowledge - in all disciplines, and of the time scale of human intellectual history as well as the intellectual growth of the child" (Gruber and Vonèche, 1977, p xiii). This is a prerequisite for the second (and from our point of view less appealing) major aim, the explanation of this growth. The other school is the organic-developmental tradition, which "... directs its efforts not toward the solution of the tricky problems of inate versus acquired function, but only toward the establishment and description of genetic types of mental activity" (Werner, op cit, p 18). To return to our argument, it has seldom been realized that various descriptions originating from different disciplines and from different "schools" of thought share a common perspective in their view of phenomena. Nor has it been realized in the case of many recent scattered efforts to characterize reality

as it is experienced by different people in different situations. Compare such topics as house wives' experience of the transition to working life, the meaning of work for the unemployed, children's thinking about God, children's conceptions of violence, the concept of force in beginning physics students at university level, the conceptions of science held by Arts students at university, teacher's perceptions of individual differences in the classroom, students' conceptions of the origins of authority, and so on. Many of the studies summarized recently by Magoon (1977) under the heading "constructivist approaches" are undoubtedly of this kind.

There is a sense of uncertainty about these - frequently isolated - research efforts. As the "tradition" which we wish to define retrospectively in terms of a certain perspective and in terms of a certain level of description, has not been identified by those whom we consider as its representatives, they either have another scientific identity or no scientific identity at all.

Our point is that descriptions which have been arrived at from the second order perspective can and should be brought together, irrespective of the source of variation they represent, of the discipline to which they belong or of the "school" of thought from which they stem.

This aggregate of descriptions making up "the perceived world" cannot be defined or specified in general terms. It is, to use Lasker's term (see footnote 4) "unvollendbar", that is, "incompletable". But we can certainly work on it, we can specify constituents, we can define relations, we can "point at it".

The existential status of Piagetian structures

The most extensive and well-known contribution to the mapping of the different ways people conceptualize the world around them has, of course, been made by Piaget and his collaborators. No one has provided anything like so many detailed and such ingenious descriptions of children's qualitatively different conceptions of various aspects of their reality as has Piaget. There is no doubt that a large portion of his empirical work (especially his early empirical work) has been carried out from what we call the second-order, phenomenal perspective. Piaget has simply described what various aspects of the world look like from the child's

point of view (or rather from the point of view of children at different age levels).

The primary aim of these descriptions has been to shed light on the development of knowledge in terms of its different forms, reflecting various aspects of reality. There has been a gradual tendency in Piaget's research, however, towards on the one hand focussing on the general similarities between the various aspects, and on the other hand, towards considering these formal similarities as psychologically real entities. This trend can be interpreted as a shift in which the child rather than the child's world, has gradually become thematic (i.e. has become the focus of attention) for Piaget. In our terminology it implies a shift from the second order to the first-order perspective.

> The more abstract conception of time mentioned above, for instance, has two main structural characteristics according to Piaget. One is the grasping of the temporal order of succession and the other is the grasping of the notion of a number of equidistant intervals between successive points in time. These two structural attributes correspond, for example, to what are for Piaget the two main aspects of the concept of number, ordinality and cardinality, as well as to what in mathematics are known as the lattice and the group structure respectively.

In this way Piaget has been able to describe formal similarities between the forms of a wide range of concepts mastered within a certain age period. The lattice and the group structure, are, furthermore, aspects of a superordinate structure called "grouping"; structural similarities between not only the conceptions of time and number, but also of quantity, speed and movement, are described.

We have to bear it in mind that if we accept the characterization of separate concepts, it is possible to question the formal similarities on logical or pragmatic but not on empirical grounds. As Strauss & Kroy (op cit) observe, at this point a decisive step taken by Piaget comes into view. He could have restricted himself to refering to the formal similarities simply as formal similarities, without stating that there is a common psychological entity underlying the various, formally similar concepts. As we know, however, Piaget did not do that. Instead, he endowed the formal structure with a factual existence by considering it as descriptive of a psychological structure of thought. As Smedslund (1977) says, this reflects an a priori ontological position of conceptual

realism. What is mastered, according to Piaget, is not the various concepts, but a formal structure which "...when applied to different domains, yields the different concepts" (Strauss & Kroy, op cit, p 104). (We may incidentally note the structural similarity with the idea discussed - and criticized - earlier of general knowledge about learning which when applied to different content areas (academic subjects) results in knowledge about the learning of these content areas).

The assumption about the acquired (or rather; constructed) general sturcture implies empirically testable corollaries. If there is a common structure underlying the ability to handle different concepts and different contents, we should expect a certain homogeneity of behaviour across tasks which have this structure in common. Individuals who possess the structure should handle the tasks in accordance with it, in contrast to those who do not possess the actual structure. The thought structure of grouping in our example above is, for instance, believed to account for the behavioural manifestations of the developmental level, which Piaget has labeled concrete-operational.

Now it is obvious even in Piaget's own writings that it does not work in this way. Our possibilities of generalizing children's ability to succeed on tasks which are structurally identical but which differ in content are severely restricted. Children frequently "succeed" on some of the tasks and "fail" on others. Piaget explains this in terms of resistance from certain objects or situations to which the general structure of thought is applied. Little or no resistance at all is then thought to be correlated with success and much resistance with "failure". This is known as horizontal décalage, which means variation within individuals across structurally similar tasks.

Content and structure

The obvious circularity of the concept of horizontal décalage has been pointed out by many critics and it has been argued that the large variation between different content areas makes the notion of "stages" highly questionable.

Not only do Brown and Desforges express doubts in their article as to the plausibility and meaningfulness of content-free mental structures but Flavell (1977) concludes that "... developmental psychologists are current-

ly becoming increasingly sceptical of the theoretical use of the construct of 'cognitive-developmental stage'" (p 248) and that non- concurrence (of concrete-operational attainment) is the rule and concurrence the exception.

Drawing on his many years' experience of research work in the Piagetian tradition as well as on the results obtained by others, Smedslund (op cit) asserts:

> "The empirical evidence did not provide much direct support for the existence of operatory structures. All kinds of discrepancies crop up with children of all ages and with adults, and with all kinds of concepts and structures. A child behaves in one way in one situation and in another way in another situation which may appear strictly equivalent to the first situation as far as task structure is concerned" (p 2).

Hundeide (1977) has assembled an impressive amount of evidence indicating that whether or not the child solves a certain task or in whatever way the child solves it is not so much a function of the logical structure of the task but of its content and of the context in which it is presented. Above all the child's performance is heavily influenced by the extent to which the experimenter's questions are interpreted by the child on the same premisses as those on which the experimenter based his question.

> Hundeide reports a study in which a picture of five cups and two glasses was shown to 36 children of 8 1/2 years of age. The question was asked: "Are there more cups or more things to drink from?" On one condition the picture was shown first and the question was asked afterwards: 17 of the 36 children thought there were most cups, thereby failing on class-inclusion, a major indicator of concrete operational thinking. In the other condition the sequence between picture and question was reversed (and the children were thus, according to Hundeide, given the possibility of interpreting the expected content in terms of the experimenter's own preconception). Only five of the 36 children in this group "failed" (pp 41-42).

The meaning of the task is not only dependent on the temporal order of question and presentation but also on the way the question is formulated and on certain perceptual details.

> For example in one study the coordination of spatial perspectives was investigated by using the Piagetian task mentioned earlier of three scale model mountains and photographs showing the mountains from four different perspectives. In this particular case three

different kinds of pictures were used. It turned out that the ease with which the children exhibited decentered thought covaried with the richness of detail: coloured pictures were easiest, then black and white ones, while silhouettes were the most difficult (ibid, pp 50-51).

Clearly not only is the notion of stages questioned; but the mastery of the very same concepts or the solving of the very same tasks has also repeatedly been proved to be dependent both on content and on contextual factors.

Indeed, long before the emergence of the critique of the lack of generalizability across content on the basis of the commonness of formal structures Werner had reported findings which indicated that whether the child exhibited an egocentric, personal conception of time or an impersonal, universal one was context-dependent. (As we pointed out above this in fact pre-dated Piaget's report of his findings on the child's conception of time). It was found that whether the question asked concerns the child's family or his visible surroundings (e.g. "What time is it in your home now?") or whether it is rather about distant towns or scenes (e.g. "What time is it in X (another neighbouring town"?) of decisive importance (op cit, p 187).

More recently Dahlgren (1978b) has provided a striking demonstration of the contextual character of conceptions.

His study draws on previous findings by Dahlgren and Marton (1978), who had discerned two different conceptions of price: price as a relation between supply and demand, and price as an inherent quality of the commodity (corresponding to its "value"). In a subsequent investigation Dahlgren (1978a) had shown that even after one semester's study of Economics at university level, a substantial number of students (in fact about two-thirds of those taking part in the investigation) held the second conception, of price-as-an-inherent-quality, in spite of the fact that the first (relational) conception had been presupposed in the Economics course they had just gone through. In the later investigation (Dahlgren, 1978b) it was found that when the same question, "Why does a bun cost 1 krona?" was asked of 30 children aged 11 and 30 aged 13, only one child in each group exhibited the supply/demand conception. However, when the question was rephrased into "Why does a diamond ring cost more than a bicycle?", 14 of the first group of children and 17 of the second gave supply/demand answers (i.e. a larger proportion than among the Economics students who had answered the first question on the price of a bun).

This study illustrates a theme which runs through this paper: there is no learning as such, there are no operatory structures as such and there is not even a conception of price as such.

This conclusion, based both on logical and on empirical considerations, has been reached by various writers and its most obvious implication is that we cannot ascribe to individuals the possession of eratory structures or even of conceptions. But what, in that case, does research in this area have to offer?

When we think that there is something wrong with the fact that the same individual is performing differently on tasks which are structurally identical but which differ in terms of content, our judgment is based on the assumption that what we should be able to do is to classify individuals in a way which makes generalizations from the individual's behaviour to other situations possible. The impossibility of making statements as to which conception of price certain individuals have is then interpreted simply as our inability to describe an individual's conceptions of price in a sufficiently reliable way. What we perhaps do not think of is that we can in fact describe conceptions of price in an absolutely reliable way. This means that the same categories of description appear in different situations. The set of categories is thus stable and generalizable between situations, even if the individuals are "moving" between the different categories on different occasions.

Individual stability across contents and situations is neither denied by us nor assumed. In our view, it should be a target of empirical investigation rather than being taken for granted: it should be regarded as something to be described and analysed. Even if it is the case that we cannot reliably and meaningfully classify children as being on the sensory-motor, concrete-operational, or formal operational stage, we may very well find it appropriate to describe their way of thinking in a certain situation as exhibiting the formal characteristics of the sensory-motor, concrete-operational, or formal operational way of thinking. Egocentric, societal and universal perspectives, for instance, may well have explanatory power in characterizing and understanding for example moral judgements made in certain concrete situations, even if we do not find it meaningful to characterize people's "real I" in those terms.

Abandoning the Piagetian assumption of the psychological existence of stages and operatory structures in individuals is very much in accordance both with the accumulation of empirical findings concerning the lack of generalizability in terms of the structure of the task and with a relational and contextual view of human functioning. And thus by restricting the meaning of the constructs Piaget uses to characterize the development of the "knowing subject" (and not, as he argues

elsewhere/ the development of knowledge) interest would probably be refocussed on the most remarkable contribution of the Piagetian tradition, the ingenious and sensitive discernment of various forms of thought, the layers of the "hidden world" of ways of understanding reality. We would argue that these forms of thought should not be considered as categories for classifying individuals, but as categories for describing ways of perceiving the world around us. In this way, the shift which we have discussed in the Piagetian research tradition would be reversed again; the perceived world, rather than the perceiving child, would become thematized (i.e. become the focus of attention).

It seems worthwhile to look at this problem from the logic of research. Let us assume that we are investigating conceptions of a certain aspect of reality in a certain group of people. Let us also assume that conceptions of this aspect of reality have not been discerned previously. If our undertaking is successful, then we may perhaps become able to describe a number of different conceptions and also to identify the distribution, over the categories, of the group participating in the study. We arrive in consequence at two different kinds of results, the categories of description themselves, and the distribution of subjects over them. The first result is a qualitative one ("What are the conceptions held?"), and the second is quantitative ("How many people hold these different conceptions?"). To accord with the canons of research methodology one is supposed to define one's variables before embarking on the empirical part of an investigation. But if the variables are defined in advance, we are in logic bound to conclude that the results are nothing but quantitative[7].

It is frequently not even recognized that categories of description can be considered as results. The extremely narrow conception of "result" in the behavioral sciences can probably "explain" why there has been so little widening of Piagetian descriptions. Even if Piaget has inspired a very large amount of research, this research has only infrequently been of a similar kind to his own, namely research which aims at characterization of the child's different ways of understanding various aspects of reality. It hardly seems plausible that Piaget has rendered further investigation of children's conceptions of reality unnecessary by emptying the pool of aspects of reality worthy of study.

Our line of reasoning here parallels to a certain extent arguments put forward more than a decade ago by the sociologists Glaser and Strauss (1967) in a book with the subtitle Strategies for Qualitative Research. It is true that they are not arguing for description but for "generating theory", yet its categories should be "... discovered by examination of the data". According to Glaser and Strauss there are on one hand a number of "theoretical capitalists" (like for example Parsons and Merton) who generate their own theories, and on the other a mass of proletarian testers, sociologists trained to test the work of "great men" but not to imitate it. We think the situation is very similar in the Piagetian tradition. Piaget himself and some of his collaborators have discerned, described, and analysed different forms of thought related to various aspects of reality. A very large amount of research has been carried out on the occurence of those forms of thought, on comparison of various groups possessing or not possessing them, and on the possibility of speeding up their development through various forms of training. Attempts to widen the domain, to add something to what has been described in Geneva have, however, been few[8].

Giorgi (1977) has recently called attention to what he calls "the lack of second generation development". He argues that constructive alternatives to mainstream psychology fail to develop because the work of the founders (such as Bartlett) of these alternatives in spite of all the honours bestowed upon them, has not been brought further. Giorgi's explanation that this is due to the lack of institutionalization of alternative approaches obviously does not apply in Piaget's case. We think that one of the main reasons is to be found in the narrow conception of the aims of research discussed earlier. Another problem is, we believe, a lack of sensitivity to the distinction between the first- and second-order perspectives.

The problem of second generation development may well appear within one and the same researcher who, having discovered some basic differences in how people conceive a certain aspect of reality, shifts the perspective from qualitative differences in the world as it appears to people to differences in a certain quality in the people. The next logical step is then to compare the extent to which various groups possess this quality and to compare the extent to which various training methods are effective in facilitating its development. (Is it un-

fair to think of Lawrence Kohlberg's work, for example, in this regard? (see in particular Kohlberg, 1971).)

Our stress on the importance of recognizing categories of description as results is based on the view that they can be seen as tools in terms of which we can analyse and understand concrete cases.

Related to the distinction above between realism and nominalism is the distinction between the essentialist and the instrumentalist views of human knowledge. The aim of science, according to the former, is to reveal "... the 'essential nature' of things - the realities which lie behind the appearances" (Popper, 1969, p 104). The instrumentalist view, on the other hand, is that the task of research is not to provide us with the ultimate truth, but rather to arrive at descriptions which are for example, in Popper's words, "convenient, simple, economical, powerful etc". Our own preferences are clearly for this second conceptualization of the idea of research.

We would argue that the outcome of a research undertaking is thus separated into two different aspects; on one hand we can view the results as categories of description considered as abstract instruments to be used in the analysis of concrete cases in the future. On the other hand we can focus on the applicability of these categories in concrete cases, considering the possibility of applying the categories in order to make a statement about an historical fact such as, for instance, that individual X exhibited conception Y under circumstance Z.

This dual character of the description has its counterpart in a correspondingly dual character of what is described. A conception exists in the real world only in terms of a mental act and it is exhibited by someone who does something in a certain setting. In talking about categories of description, then, we "bracket" the dynamic-activity perspective and we consider the categories almost as if they were "frozen" forms of thought.

The relationship between conception as an act of conceiving and conception as a category of description resembles the relationship between Lewis Carroll's smiling cat and the smile that is left when the cat is separated from the smiling.

The collective mind

The categories of description, denoting forms of thought, which we bring together in order to characterize the perceived world (or at least fragments of it), are arrived at by separating forms of thought both from the thinking and from the thinker. This sectioning-off of thought from thinker, in spite of obvious differences in other respects, has a certain similarity to Popper's (1972) notion of Epistemology without a knowing subject. In Popper's view, we can speak not only of a world of physical objects and physical states ("the first world") and of a world of states of consciousness ("the second world") but also of a "third world" of "objective contents of thought". He thinks of this "third world" in terms of valid scientific knowledge which changes in an evolutionary way; some forms die, others evolve.

What is separated from "the knowing subject" in Popper's case is the body of propositional knowledge regarded as valid at a certain point in the history of science. What we want to thematize on the other hand is the complex of possible ways of viewing various aspects of the world, the aggregate of basic conceptions underlying not only different, but even alternative and contradictory forms of propositional knowledge, irrespective of whether these forms are deemed right or wrong. Popper's "third world" is a world of the first-order perspective, ours of the second.

Nevertheless, we share Popper's evolutionary outlook. By means of scientific progress new ways of conceiving aspects of reality are introduced into thinking in general. This is what Liedman (1977) calls the ideological function of science. He argues that when Darwin's theory of evolution first took root, for instance, it did not have any implications whatsoever for material production ("it didn't even get a single swede to grow faster"). Instead, it had an enormous impact on the view of nature and of the place of man in nature.

Another example is the work of Einstein, who added a third conception of time to those two conceptions which were described above in terms of a distinction between local and personal time and universal and impersonal time. Einstein's concept has something of both. Being a variable aspect of different material systems, time is local in his world of thought but it is certainly not personal.

New forms of thought are thus introduced from time to time and become, through being transformed to common categories of interpretation, part of "the perceived world". This is one of the reasons why an "ultimate" description of human thinking can never be achieved. To repeat our earlier point: it is, in the terminology of Emanuel Lasker, "unvollendbar".

In the 1976 Reith lectures broadcast on BBC radio the biologist Colin Blakemore argued that:

> "Just as individual memory has partly released each animal from the immediate restrictions of the genetic code, so the sharing of learned ideas by social animals has added an entirely new dimension to the progress of evolution" (Blakemore, 1977, p 116).

He describes how certain discoveries made by an ingenious macaque monkey (a method for cleaning unpalatable sand from sweet potatoes and a method for sifting wheat by flotation) were spread by social learning not only to the other members of the troop but even to subsequent generations. The skills became part of the social inheritance:

> "By sharing of ideas, animals, and most especially humans, pool the ability of their group. The pinnacles of intelligence are exploited by the entire society. In human culture, this has led to the emergence of a kind of communal intellect - the Collective Mind of man - that has pushed forward his biological progress at a prodigious rate" (ibid, p 117).

Seen from this view-point, human intelligence (in the collective sense) is improving steadily, as new possibilities are continually added to those previously available. This perspective differs radically from the more traditional conceptualization of intelligence as an individual quality. From this content-orientated and "communal" point of view, human intelligence is regarded as a structured pool of ideas, conceptions, and beliefs underlying the possible interpretations (or the possible constructions) of reality.

This superindividual system of forms of thought, this perceived world, is we believe descriptive of human thought in two ways. It can be used as an <u>instrument for description</u> of the way people think in con-

crete situations and, from the collective perspective, it can be seen as a description of thinking.

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Notes

1. The terms "noumenal" and "phenomenal" are taken from the central distinction in Kant's philosophy between the thing-in-itself (noumenon) and the thing as it appears (phenomenon).

2. There has been considerable discussion of, for example, the two major ways of answering "why"-questions in social sciences, that is, in terms of causes and in terms of intentions. One represents the external point of view, from which acts appear as behaviour, while the other represents the internal point of view, from which behaviour appears as acts. These two perspectives are - in our opinion - complementary to each other, as are the superordinate perspectives of matter-of-fact reality and perceived reality:

> "The dilemma Erklären-Verstehen cannot be resolved either by simply rejecting one of the alternative methods, or by relegating them to two different fields of application (sciences versus history and philosophy). Explanation and understanding are two opposite, but complementary dimensions of social inquiry" (Markovic, 1972, p 27).

These two "dimensions of social inquiry" appear thus at the perceived-world level of description as two ways of conceptualizing what people do and why they do it. And it is worthwhile noting that the difference between answering "why"-questions in terms of intention and answering them in terms of causes has been pointed out by Piaget in his first major work The Language and Thought of the Child (1926). In young children intentionality is in fact the only perspective available and everything that happens to them is consequently seen in this perspective, because the child has not yet differentiated the physical and the psychological worlds.

3. This is far from being a logical necessity. The process of learning can, of course, be characterized in terms of the learner's experience of this process. Although this aspect has received little attention in this article, such a description was in fact given in our own paper cited above (Marton & Säljö, op cit). The two levels of processing described in that paper indeed refer to two different conceptions of learning found in university students: learning as a transferring of bits of knowledge from the pages of the textbook into one's head, i.e. learning as something that happens to you, and learning as an act of finding out something about the reality beyond the textbook, but through and by means of what is in the pages of the textbook, i.e. learning as something you do.

Other examples of experiential descriptions of learning are phenomenological studies carried out by Giorgi, who defines learning as "...a certain way of perceiving specific kinds of situations" (1975, p 97) and by his student Colaizzi, who defines learning as "...that activity whereby the learner extracts from material his learned-content, which is a meaning-idea of which he had no previous knowledge and which he posits as true" (1973, p 145). Paradoxically, these psychologists of the phenomenologist tradition aim to describe not the experience of learning (as we do), but rather learning as such, for they do not accept our distinction between learning and the experience of learning. While in what the phenomenolo-

gists call the natural attitude (corresponding to "our" first-order perspective), the latter (i.e. the experience of learning) is reduced to the former (i.e. learning as such), in the phenomenologist tradition the reverse is true; the former is reduced to the latter ("There is no other access to learning except through the experience of learning" (Giorgi , 1978)).

As we pointed out at the very beginning of this article, we consider these two perspectives to have a complementary and not a contradictory or alternative relationship to each other. In our view, description of the perceived content ant the perceived process of learning thus represent two subordinate perspectives within the superordinate first-order perspective (as is the case with the distinction drawn above between an intentional and a causal perspective). As to the line of reasoning below concerning the logical unity of the learning-as-process and the learning-as-content perspectives, it does in fact not matter whether these two belong to the two different superordinate perspectives or whether they represent two subordinate perspectives within the same superordinate perspective).

4. In a remarkable recent essay, Andersson (1978) refers to the monumental work by the famous chess player Emanuel Lasker, Die Philosophie des Unvollendbar, published in 1919. Lasker dedicated himself to drawing a line of demarcation between two kinds of entities; none of them exists in the material world, but one has a conceivable limit and the other has not. Nobody has seen "pure silver", for instance, yet we can think of an infinite series of purer and purer silver. Moreover, we can even register a gradual decreasing in the deviance, even if it can never be total. On the other hand, "the thing-in-itself", for example, is not only inaccessible to our senses, but its limit is inconceivable to our minds. We experience a thing in terms of a series of qualifiers and we cannot impose any order on this series to make it converge towards a quality free from qualifiers. "The thing-in-itself" is "unvollendbar". It is "incompletable".

5. And these differences are certainly not restricted to the subject matter of various disciplines. In fact it is a question of differences between people in their apprehension of all the various aspects of the world around them.

6. The difference between the undifferentiated mode of perception ("participation" in Levy-Bruhl's terminology) and the separation of object from subject is obviously more basic than the difference between the personal and the universal conception of time. The former is implied by the latter and the latter is "explained" by the former. The difference between the two ideas of time is of course not explained in the sense of a scientific explanation, but it is explained in the same sense as other phenomena are explained by this difference:

> "The concept of time may help to explain beliefs, attitudes, practices, and general way of life of African people not only in the traditional set up but also in the modern situation (whether of political, economical, educational, or Church life") (Mbiti, op cit, p 16).

Describing conceptions of the world around us is not a question merely of listing one conception after another. Some aspects are

certainly more basic than others and different (and more or less fundamental) layers of the perceived world can be revealed.

The conception of reality which we describe represents, however our own understanding of the way people understand the world. As was pointed out earlier, the conceptions described are thus in actual fact categories for describing conceptions, and relations between categories of description cannot but be of a logical nature. The structure we can find in (or impose on) the perceived world must necessarily be of the logical kind.

At this point, Smedslund's plea (1970, 1978) for commonsense psychology is relevant. One of his basic ideas concerns the circular relationship between logic and understanding, which means that in the study of thinking we have either to take logic for granted (in order to study understanding) or to take understanding for granted (in order to study logic). When interpreting differences, for example, in the solving of an experimental task, we can assume that people are logical and that differences in performance originate from differences in understanding the premisses underlying the task, thereby making these differences the target of the investigation. On the other hand it is more frequently the case that people's understanding of the premisses of the task is assumed, and the differences in performance are analysed in terms of differences in logicality.

In everyday life the first of these two strategies is followed; logicality being an aspect of the very idea of a person, we regularly try to trace the source of confusion to differences in understanding.

Restricting himself to a subset of commonsense notions (namely to notions related to the domain of psychology), Smedslund argues that psychology should follow the example of everyday life by taking logic for granted and directing itself towards revealing the structure of the interrelated conceptions underlying our understanding of psychological phenomena. Since we presuppose logicality, assertions about the phenomena follow tautologically from our axiomatic beliefs.

7. The consideration of categories of description as the main result of a certain research undertaking is by no means restricted to the realm of perceived reality (to the second-order perspective and the second-order level of description) but is applicable to statements about reality (i.e. to the first-order perspective and the first-order level of description) as well. Possible processes or possible effects, once detected, become tools to be used in analysing and grasping our world.

> Johansson (1975) has, for instance, recently identified a certain mechanism which often dominates the teaching strategy in severely constrained situations. This is the very frequent case of the teacher in the classroom who is confronted by a student unable to handle the task assigned to him. The choice of action is usually constrained both by time and by the fact that other students are waiting for the teacher's assistance. The conflict between the need to instruct the student and the lack of possibility of making him understand the task is "solved" by the teacher breaking down the task into more and more elementa-

ry components until reaching those which are within the grasp of the student. In this way the teacher in fact completes the task for the student without any learning taking place in the latter.

This mechanism has been labeled piloting. We regard it as a category of description which may facilitate our understanding of what is going on in the class-room. Through its recognition where applicable it probably makes the course of events easier to grasp.

8. A notable example of these scattered efforts is Perry's work (1970) which describes college students' progression from an absolutistic view of knowledge to a relativistic conception and thence - in certain cases - to an attitude characterized by commitment.

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